

ABSTRACT

A stretchable coiled-sheet stent includes a coiled-up sheet having overlapping inner and outer longitudinal sections that is expandable between contracted and enlarged conditions, and a plurality of stretchable elements formed in the coiled-up sheet which are expandable between unstretched and stretched conditions. The coiled-up sheet is preferably formed from a temperature-based shape memory material, such as Nitinol, and at least one of the unstretched and stretched shapes is programmed into the shape memory. For example, the stretchable elements may be initially formed in the stretched shape, and the sheet heat treated to program the stretched shape into the shape memory. After cooling, the stretchable elements may be constrained in the unstretched shape for delivery. Alternatively, the stretchable elements may be formed in the unstretched shape and plastically deformed to their stretched shape, and the sheet may be heat treated to program the stretched shape into the shape memory. Upon cooling, the stretchable elements may return to their unstretched shape. The coiled-sheet stent is delivered in its contracted condition with the stretchable elements in the unstretched shape. The stent is introduced into a blood vessel and advanced to a target location, exposing the stent to the body

temperature and activating the shape memory to bias the stretchable elements towards the stretched shape. The stent is deployed, at least partially expanding towards the enlarged condition due to the bias of the stretchable elements towards the stretched shape.

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